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Estimated Influenza Vaccination Coverage Among Adults and Children — United States, September 1, 2004–January 31, 2005

In response to the unexpected shortfall in the 2004–05 influenza vaccine supply, CDC recommended in October 2004 that vaccine be reserved for persons in certain priority groups, including persons aged ≥ 65 years and 6–23 months, persons aged 2–64 years with conditions that increased their risk for influenza complications, residents of chronic-care facilities, close contacts of infants aged < 6 months, and health-care workers with direct patient contact (1). In late December 2004, based on declining demand among these groups, two additional groups (i.e., healthy persons aged 50–64 years and household contacts of all persons at high risk) were added to the list of vaccination priority groups (2). To monitor influenza vaccination coverage during the 2004–05 season, the Behavioral Risk Factor Surveillance System (BRFSS), an ongoing, state-based, telephone survey of civilian, noninstitutionalized persons, added new questions to collect information on priority status and the month and year of vaccination for adults and children (3). This report is based on analysis of data collected during February 1–27, 2005, regarding respondent-reported receipt of influenza vaccination during September 1, 2004–January 31, 2005. The results of this analysis indicated that influenza vaccination coverage levels through January 2005 among adults in priority groups nearly reached those in recent years, whereas coverage levels among adults not in priority groups were approximately half of levels in 2003, in part because 9.3% of those unvaccinated persons in nonpriority groups declined vaccination this season. The results further suggested that designation of the priority groups successfully directed the nation's influenza vaccine supply to those at highest risk. In addition, vaccination coverage among children aged 6–23 months was notable (48.4%), given that 2004–05 was the first year this group was recommended for influenza vaccination (4).

In previous years, BRFSS asked adult respondents whether they had been vaccinated against influenza during the preceding 12 months. No influenza vaccination questions were asked

regarding children, and the only questions related to high-risk medical conditions referred to diabetes and asthma. To more closely monitor coverage during this shortfall season, influenza vaccination questions were added during November 2004–February 2005 regarding children, priority group status, and month and year of vaccination. For comparison with the 2004–05 season, data from the 2003 National Health Interview Survey (NHIS) were used. Similar to the BRFSS survey question, NHIS routinely asks adult respondents if they received a “flu shot” during the preceding 12 months; NHIS also collects information on occupations and high-risk medical conditions. NHIS was conducted during 2003 and consisted of in-person interviews; the household response rate was 89.2%. For children, the only previous available national data on influenza vaccine coverage were collected in the 2003 National Immunization Survey (NIS), which reported on vaccination coverage during the 2002–03 season for children aged 6–23 months with an overall response rate among eligible households of 62.7% (5).

Because BRFSS data collection is ongoing, final response rates for February were not yet available. Preliminary estimates indicate that the median state-level response rate for February was 51.7% (range: 33.4%–69.8%), based on CASRO guidelines. Analysis was based on 26,868 interviews from 50 states and the District of Columbia.

Vaccination Coverage Among Adults

Among adults, influenza vaccination coverage through January of the 2004–05 season was highest among persons aged ≥ 65 years (62.7%), followed by health-care workers with patient contact (35.7%) and those aged 18–64 years with high-risk conditions (25.5%) (Table 1). In comparison, the 2003 NHIS indicated coverage of 65.6% for persons aged ≥ 65 years, 40.1% for health-care workers, and 34.2% for adults aged 18–64 years with high-risk conditions. In contrast, influenza vaccination coverage among healthy persons aged 18–64 years who were not health-care workers or contacts of children aged < 6 months was lower than in the previous season (8.8% compared with 17.8%) (CDC, unpublished data, 2005). Among the reasons cited by respondents for not receiving vaccination, was “saving vaccine for people who need it more,” cited by 9.3% of those who were not in priority groups and were not vaccinated. This represents approximately 17.5 million doses of vaccine potentially made available to persons in priority groups.

Vaccination uptake was higher in October and November and tapered off during December and January (Figure). Among the adults in the priority groups established in October,

TABLE 1. Percentage of adults reporting influenza vaccination,* by vaccination priority status† — Behavioral Risk Factor Surveillance System, United States, 2004–05 influenza season

Vaccination priority status	September 2004–January 2005		
	No. surveyed	%	(95% CI§)
Persons aged 18–64 years with high-risk conditions¶	4,339	25.5	(±2.6)
Persons aged ≥65 years	6,345	62.7	(±2.1)
Health-care workers with patient contact**	1,750	35.7	(±4.0)
Total adults in initial priority groups††§§	12,134	42.0	(±1.7)
Healthy persons aged 18–49 years	9,316	6.9	(±1.0)
Healthy persons aged 50–64 years	5,528	16.5	(±1.8)
Total nonpriority group adults aged 18–64 years	14,392	8.8	(±0.9)

* Interviews were conducted during February 1–27, 2005.

† Does not include persons in the following additional vaccination priority groups: residents of nursing homes and long-term-care facilities and out-of-home caregivers for children aged <6 months.

§ Confidence interval.

¶ Asthma, other lung problems, heart problems, diabetes, kidney problems, weakened immune system, anemia, or pregnancy.

** Self-reported description might include doctors, nurses, laboratory workers, and office receptionists.

†† Persons can be included in more than one priority group.

§§ Includes persons with an infant aged <6 months in the household; stable estimates for this group could not be estimated separately because of its small sample size.

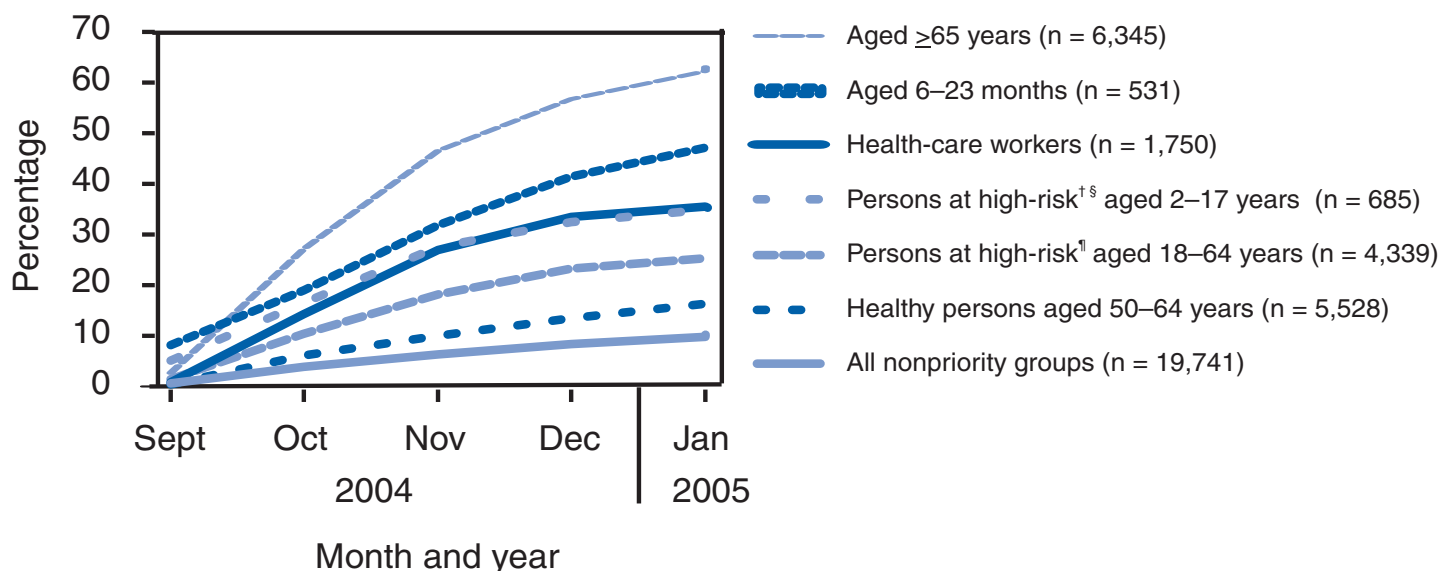
2% of the vaccinations through January occurred in September, 40% in October, 32% in November, 17% in December, and 9% in January.

Vaccination Coverage Among Children

Influenza vaccination coverage (≥1 doses) among children aged 6–23 months (48.4%) and among children aged 2–17 years with high-risk conditions (34.8%) was substantially higher than among children not in priority groups (12.3%) (Table 2). Of the vaccinations received through January, 17% occurred in September, 23% in October, 28% in November, 20% in December, and 12% in January (Figure). In comparison, the 2003 NIS data indicated that coverage among children aged 6–23 months for the 2002–03 influenza season, before they were recommended for vaccination by the Advisory Committee on Immunization Practices (ACIP), was 7.4% (5).

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FIGURE. Monthly influenza vaccination coverage among selected priority populations, by month — Behavioral Risk Factor Surveillance System, United States, 2004–05 influenza season*



* Interviews were conducted during February 1–27, 2005.

† Does not include persons in households with infants aged <6 months, out-of-home caregivers of infants aged <6 months, or others with rare, high-risk conditions.

§ Asthma; other lung, heart, or kidney problems; diabetes; weakened immune system; anemia; or aspirin therapy for chronic conditions.

¶ Asthma; other lung, heart, or kidney problems; diabetes; weakened immune system; anemia; or pregnancy.

TABLE 2. Percentage of children aged 6 months–17 years reported to have received influenza vaccination,* by vaccination priority status — Behavioral Risk Factor Surveillance System, United States, 2004–05 influenza season

Vaccination priority status	September 2004–January 2005		
	No. surveyed	%	(95% CI) [†]
Children aged 6–23 months	531	48.4	(±8.8)
Children aged 2–17 years with high-risk conditions [§]	685	34.8	(±7.1)
Total children in priority groups	1,216	42.2	(±5.9)
Nonpriority group children and others aged 2–17 years	5,349	12.3	(±1.8)

* Interviews with household members were conducted during February 1–27, 2005.

[†] Confidence interval.

[§] Asthma, other lung problems, heart problems, diabetes, kidney problems, weakened immune system, anemia, or aspirin therapy for chronic conditions.

^{||} Includes children aged 2–17 years who might be in additional priority groups, such as those with rare conditions not included in the survey and household contacts or out-of-home caregivers for infants <6 months.

Editorial Note: During September 1, 2004–January 31, 2005, estimates of influenza vaccination coverage indicate that despite an unexpected and substantial vaccine shortfall, coverage levels among adults in the original influenza vaccine priority groups were similar to historical demand based on the 2003 NHIS (3), thereby suggesting the effectiveness of prioritization. This resulted, in part, from the estimated 17.5 million persons not in priority groups whose primary reported reason for not being vaccinated was to save vaccine for people who needed it more. According to the February 2005 BRFSS, approximately two thirds of the administered vaccine doses through January went to persons in the initial priority groups identified in October whereas, during 2003, only approximately one half of all doses of influenza vaccine were administered to persons in these groups.

The provision of ≥ 1 doses of influenza vaccination to 48.4% of children aged 6–23 months during this first influenza season following implementation of the ACIP recommendations suggests how quickly physicians and parents can adopt a new disease-prevention guideline (4–6). Because the Chiron vaccine was not licensed for use in children aged <4 years, the supply of influenza vaccine for children aged 6–23 months was not affected by the shortfall.

For the first time, a nationwide, state-based surveillance system (i.e., BRFSS) was used to assess influenza vaccination coverage by month of vaccination and provided the capability to report at intervals as brief as 1 week. This surveillance system also provided the first national influenza vaccination coverage estimates for children aged 2–17 years with high-risk conditions. Having national and state population-based estimates of vaccination coverage by month and priority status from early in the influenza season afforded policy makers,

health-care providers, public health leaders, and the public timely information to make decisions regarding distribution and usage of the limited supply of vaccine.

The findings in this report are subject to at least four limitations. First, BRFSS is a land-line telephone-based survey and excludes those segments of the population without telephones or who use only cellular telephones. Second, data are self-reported and subject to recall bias, particularly for questions that require recall over a longer period; therefore, for certain behaviors, prevalence estimates might be under- or overreported. Third, certain influenza vaccine priority groups were not considered in the survey, including institutionalized adults and adult caretakers of children aged <6 months outside of the home (e.g., child care workers). Finally, these results do not include all of the vaccinations received during the 2004–05 influenza season. However, based on reports of vaccination, estimated 2004–05 coverage appeared to increase by less than one percentage point during February among all the priority and nonpriority groups except those aged 6–23 months, among whom coverage appeared to increase nearly four percentage points, from 48.4% to 52.2%.

Comparability of findings from the BRFSS survey with results of the 2003 NHIS is limited because of differences in the survey designs and timeframes. First, the 2003 NHIS is conducted throughout the entire 2003 calendar year. Thus, the results reflect vaccinations received anytime during the entire 2002–03 influenza season and vaccinations received during parts of both the 2001–02 and 2003–04 seasons. Second, the interviews are conducted in person, rather than by telephone. Analysis of 2005 NHIS data, when they become available, will be helpful to further assess the impact of the 2004–05 vaccine shortfall and to provide comparisons with results from the February 2005 BRFSS survey.

Vaccination patterns during the 2004–05 influenza season have been affected by several factors. Although an unexpected and substantial reduction of vaccine supply occurred at the beginning of the season, prioritization was quickly recommended and followed. The 2004–05 influenza season was less severe than the 2003–04 season and did not peak until mid-February (7). In addition, this was the first full season following the ACIP recommendation to vaccinate all children aged 6–23 months.

Despite the shortfall of inactivated influenza vaccine, the level of coverage achieved among those groups prioritized in 2004–05 appears to be similar to historical coverage. Additional guidelines for prioritization of influenza vaccination in the event of a future influenza vaccine shortfall are in development and should assist with efforts to maximize use of available vaccine.

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Influenza Vaccine Prebooking and Distribution Strategies for the 2005–06 Influenza Season

For the 2004–05 influenza season, CDC, in coordination with the Advisory Committee on Immunization Practices (ACIP), issued interim influenza vaccine use recommendations after Chiron Corporation announced that none of its inactivated influenza vaccine (Fluvirin[®]) would be available in the United States (1). To plan for the upcoming 2005–06 influenza season, CDC has met with influenza vaccine manufacturers, including those intending to apply for approval to sell in the United States, to develop supply projections and distribution strategies, including prebooking (i.e., advance ordering of vaccine) and partial shipment of orders to those customers who prebook. As of March 25, 2005, the supply of inactivated influenza vaccine projected for the 2005–06 season appeared adequate to meet the historical demand from persons in the priority groups established by ACIP during the 2004–05 season. If more vaccine becomes available, additional groups can also be targeted for vaccination.

Projected Vaccine Supply for the 2005–06 Influenza Season

During 2004–2005, Aventis Pasteur (now Sanofi Pasteur, after the merger of Aventis Pasteur and Sanofi) and MedImmune produced approximately 61 million doses of influenza vaccine for distribution in the United States. These two manufacturers anticipate producing approximately the same amount or slightly more doses for the upcoming season. How much, if any, influenza vaccine will be supplied by Chiron to the U.S. market is not known. On March 2, 2005, the

British Medicines and Healthcare products Regulatory Agency (MHRA) lifted its October 5, 2004, suspension of Chiron's license to manufacture influenza vaccine (announcement available at <http://www.fda.gov/bbs/topics/news/2005/new01160.html>). The Food and Drug Administration (FDA) must also give its approval before this vaccine can be distributed in the United States. In addition, other manufacturers are discussing with FDA the possible licensure of influenza vaccine for the 2005–06 influenza season and beyond.

Prebooking and Distribution of Inactivated Influenza Vaccine

The primary method for reducing infections and complications from influenza is immunoprophylaxis with vaccine. The 2010 national health target for influenza vaccine coverage in noninstitutionalized adults aged ≥ 65 years is 90% (objective 14-29a); for noninstitutionalized adults at high risk aged 18–64 years, the coverage target is 60% (objective 14-29c) (2). Neither objective has been achieved. Based on data from the Behavioral Risk Factor Surveillance System (BRFSS) survey for the 2004–05 influenza season, influenza vaccination coverage was estimated at 62.7% for persons aged ≥ 65 years. For persons aged 18–64 with high-risk conditions, coverage was estimated at 25.5%, and for health-care workers with patient contact coverage was estimated at 35.7%. For children aged 6–23 months, coverage was estimated at 48.4% and for children aged 2–17 years with high-risk conditions, coverage was estimated at 34.8% (3). When combined with population estimates for these priority groups, the coverage estimates correspond to a total of approximately 40 million doses of influenza vaccine. To achieve 90% coverage in adults aged ≥ 65 years and 60% coverage for all other priority groups, approximately 70 million doses of vaccine would be needed (CDC, unpublished data, 2005). The supply of influenza vaccine projected from Sanofi Pasteur and MedImmune for the 2005–06 influenza season appears sufficient to meet the historical demand for vaccine by persons in all the priority groups established by ACIP during the 2004–05 influenza season. If additional vaccine becomes available above these levels (e.g., as a result of licensure of one or more additional manufacturers), additional groups can also be targeted for vaccination during the 2005–06 season.

Given the uncertainty about the number of doses of inactivated influenza vaccine that might be available for the 2005–06 season, CDC encourages implementation of a two-tiered prebooking strategy by manufacturers, distributors, and customers of inactivated vaccine. This prebooking strategy requires customers of inactivated vaccine to provide two requests for supplies, using 1) the number of doses needed

based on anticipated demand among persons in the priority groups, in the event vaccine supply is limited, and 2) the number of doses needed based on priority group use, plus other groups, if supplies prove sufficient to meet demand from other persons seeking vaccination.

Whenever feasible, CDC also encourages a distribution strategy in which partial shipments are first shipped to all prebooked customers, early in the vaccination season, followed by additional shipments later in the season. This strategy will enable all providers to administer vaccine initially to those persons at high risk, even when supplies are limited.

Priority Groups for Prebooking of Inactivated Influenza Vaccine

The following priority groups should be used as a guide for prebooking orders for inactivated influenza vaccine:

- Persons aged ≥ 65 years.
- Persons aged 2–64 years with underlying chronic medical conditions.
- All women who will be pregnant during the influenza season.
- All children aged 6–23 months.
- Health-care workers involved in direct patient care.
- Out-of-home caregivers and household contacts of children aged < 6 months.
- Residents of nursing homes and long-term-care facilities.
- Children aged 6 months–18 years on chronic aspirin therapy.

These strategies for prebooking and distribution do not apply to live, attenuated influenza vaccine (LAIV), manufactured by MedImmune, which can be ordered in the usual manner for those persons for whom LAIV is indicated. LAIV can be administered to healthy persons aged 5–49 years who are not pregnant, including health-care workers who are not caring for severely immunocompromised patients in special care units. Further details regarding CDC influenza vaccination recommendations will be published in April 2005 in the annual Prevention and Control of Influenza *MMWR Recommendations and Reports*. In addition, updated information on inactivated influenza vaccine supply for the 2005–06 influenza season will be provided as it becomes available.

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Brief Report

Outbreak of Marburg Virus Hemorrhagic Fever — Angola, October 1, 2004–March 29, 2005

On March 30, this report was posted as an MMWR Dispatch on the MMWR website (<http://www.cdc.gov/mmwr>).

On March 23, 2005, the World Health Organization (WHO) confirmed Marburg virus (family Filoviridae, which includes Ebola virus) as the causative agent of an outbreak of viral hemorrhagic fever (VHF) in Uige Province in northern Angola. Testing conducted by CDC's Special Pathogens Branch detected the presence of virus in nine of 12 clinical specimens from patients who died during the outbreak.

During October 1, 2004–March 29, 2005, a total of 124 cases were identified; of these, 117 were fatal (1). Approximately 75% of the reported cases occurred in children aged < 5 years; cases also have occurred in adults, including health-care workers. Predominant symptoms have included fever, hemorrhage, vomiting, cough, diarrhea, and jaundice.

WHO and international partners in the Global Outbreak Alert and Response Network (GOARN) are working with the Ministry of Health in Angola in conducting an investigation and public health response to the outbreak. Outbreak-control efforts are directed at providing technical support for case management, strengthening infection control in hospitals, improving surveillance and contact tracing, and educating local residents about the disease and its modes of transmission.

As part of the public health response, CDC will be sending personnel to join the WHO-coordinated GOARN response team to assist with epidemiologic investigation, infection control, and laboratory diagnosis. In addition, CDC will continue to provide laboratory and other scientific and logistical support. On March 25, CDC posted a notice on its website to inform travelers about the outbreak (available at http://www.cdc.gov/travel/other/marburg_vhf_angola_2005.htm). This website will be updated as new information becomes available. No U.S. travel restrictions to the affected area are recommended at this time.

Marburg virus disease presents as an acute febrile illness and can progress within 6–8 days to severe hemorrhagic manifestations. After an incubation period of 5–10 days, onset of the disease is sudden and is marked by fever, chills, headache, and myalgia. Approximately the fifth day after onset of symptoms, a maculopapular rash might occur, after which nausea, vomiting, chest pain, sore throat, abdominal pain, and diarrhea might appear. Signs and symptoms become increasingly severe and can include jaundice, inflammation of the pancreas,